



Pub No. 102-627 (N/9/16)

Upper Big Ditch

Summary of 2015 Surface Water Monitoring Program Results

Washington State Department of Agriculture

Natural Resources Assessment Section

September 2016

Introduction

The Washington State Department of Agriculture has monitored pesticide concentrations in surface water throughout Washington since 2003. WSDA takes water samples during the typical pesticide use season (March through September). In 2015, 14 sites were monitored in Washington, four in Skagit County. State and federal agencies use this data to evaluate water quality and make exposure assessments for pesticides registered for use in Washington State.

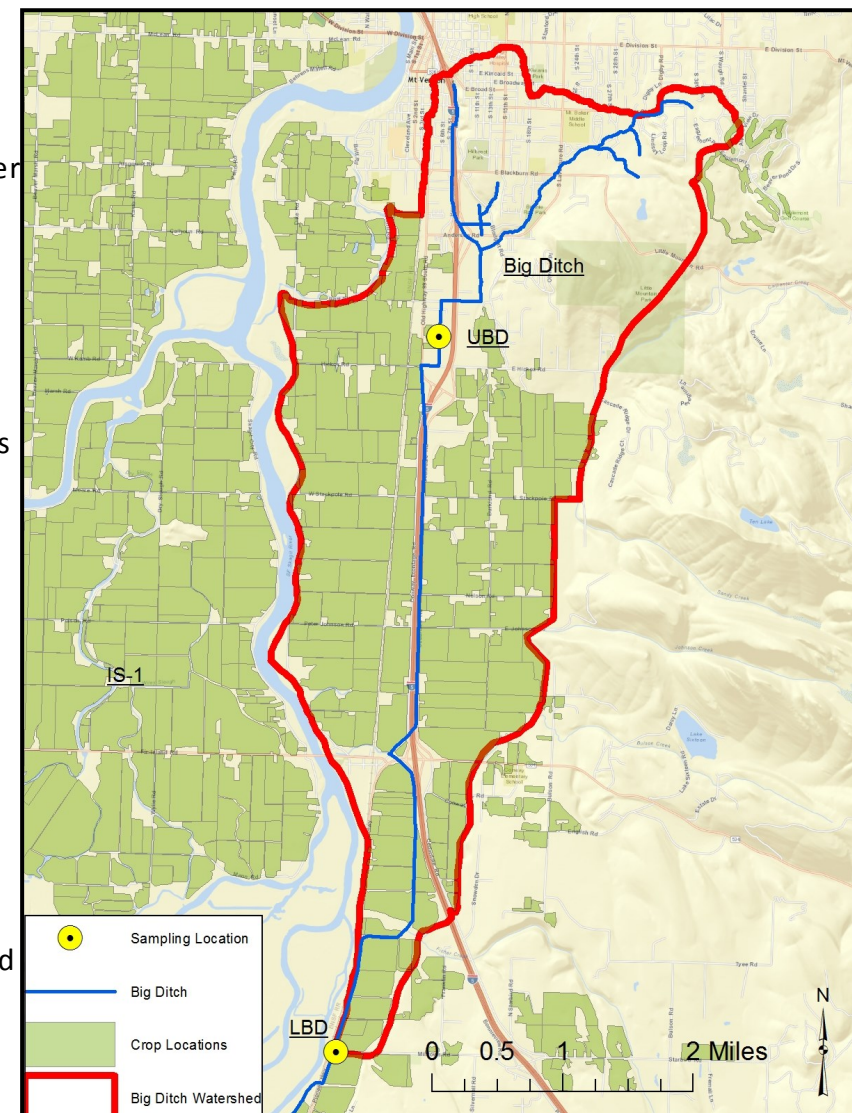
Study Area

WSDA has sampled water from Upper Big Ditch from 2007 through 2015. The entire watershed including the Lower Big ditch sampling location drains about 4,200 acres of farmland. The Upper Big Ditch site captures drainage from urban, commercial and a small amount of agricultural land. Upper Big Ditch provides habitat for coho salmon*. The Skagit Valley (and the Browns Slough watershed) is also a crucial area for migratory waterfowl, including trumpeter swans, tundra swans, snow geese, and other birds.

* Washington State Department of Fish and Wildlife

Sampling Details

- Sampled water for 25 weeks in 2015 from March 9 through August 24.
- Water samples were tested for 206 chemicals: current and legacy insecticides, herbicides, fungicides, rodenticides, wood preservatives, and pesticide degradates.
- Sample analysis for pesticides and total suspended solids was conducted at Manchester Environmental Laboratory in Port Orchard, WA.
- General water quality parameters; dissolved oxygen, conductivity, pH, water temperature, and streamflow were measured at every sampling event.
- Air and water temperature (measured every 30 minutes) was monitored for the entire sampling season.



This table shows the pesticides detected, with dates and concentrations. They are color coded to identify which assessment criteria were surpassed. The assessment criteria used here are state and federal water quality criteria, reduced by half for safety. This 0.5 safety factor is used to make sure the criteria protect aquatic life and water quality issues are found early. Watersheds with detections above the criteria are prioritized for more monitoring and educational outreach. See <http://agr.wa.gov/PestFert/natresources/SWM> for more information.

		Month and Day		Mar				Apr				May				Jun					Jul				A	
		Analyte Name †	Use‡	9	18	23	31	6	14	20	28	4	12	18	26	1	8	16	22	30	6	14	20	27	4	10
Assessment Criteria		2,4-D	H		0.093	0.051	0.2		1.2	0.078	0.07						0.12	0.057	0.6			0.155	0.06		0.026	
		Acetamiprid	I-N								0.027															
May affect fish survival at sensitive life stages		AMPA	H	--	--	--	--	--	0.27	0.18	0.19	0.18	0.17	--	--	--	--	--	--	--	--	--	--	--	--	--
		Azoxystrobin	F					0.065	0.018	0.035	0.072	0.083	0.01	0.053		0.018	0.059	0.11	0.03	0.04	0.11	0.02	0.026	0.012	0.036	1.1
		Bifenthrin	I-Py							0.028				0.025												
Additional level of protection for endangered species		Boscalid	F	0.052		0.13		0.39	0.069	0.21	0.76	0.23	0.14	0.27	0.13	0.4	1.5	0.62		0.41	0.76	0.024	0.31	0.095	0.31	0.56
		Captan	F																				0.74		0.18	0.96
		Carbaryl	I-C						0.013																	
May affect invertebrate survival		Cyprodinil	F					0.032	0.012	0.036	0.013							0.011			0.014		0.016	0.01	0.018	0.019
		Dicamba	H		0.021																					
		Dichlobenil	H	0.006	0.033	0.057	0.15	0.022	0.08	0.016	0.022	0.015		0.014												
Nearing a pesticide state water quality standard		Difenoconazole	F				0.029		0.021		0.164															
		Dinotefuran	I-N	0.485	0.369	0.744	0.492	0.67	0.258	0.428	0.614	0.31	0.69	0.495	0.18	0.19	0.74	0.27		0.14	0.53	0.076	0.079	0.077	0.88	0.34
		Diuron	H				0.04	0.007	0.019	0.011	0.005				0.008	0.011	0.006	0.01	0.005	0.011	0.009	0.014	0.008	0.014		0.011
May affect fish growth or reproduction with prolonged exposure		Etridiazole	F				0.028	0.18	0.05		0.033		0.028			0.17				0.72						
		Fludioxonil	F			0.28	0.077	2.2	0.12	0.49		0.42	0.18	0.46	0.13	0.58	1.8	1.6		1.2	2.2		0.99	0.54	0.88	0.78
		Glufosinate-ammonium	H	--	--	--	--	--	0.085	0.016	0.28	0.079	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May affect invertebrate growth or reproduction with prolonged expo-		Glyphosate	H	--	--	--	--	--	1.3	0.12	0.16	0.115	0.11	--	--	--	--	--	--	--	--	--	--	--	--	--
		Imazapic	H																				0.006			
		Imazapyr	H	0.024	0.017	0.018	0.035	0.027	0.027	0.022	0.024	0.024								0.019						
May affect aquatic plant growth		Imidacloprid	I-N			0.013		0.039	0.017	0.028	0.103	0.04		0.024		0.018	0.047	0.053	0.043	0.033	0.084	0.019	0.032		0.087	0.12
		Isoxaben	H														0.02									
		MCPA	H		0.071				0.059	0.052																
May affect aquatic plant growth or reproduction with prolonged expo-		Mecoprop (MCPP)	H		0.074	0.048	0.12		0.056																	
		Metalaxyl	F					3.3						0.051				0.15			0.041				0.18	
		Methiocarb	I-C							0.033																0.039
Below all identified criteria		Myclobutanil	F								0.008					0.013	0.01			0.028					0.036	
		DEET	IR			0.031																	0.011	0.042		
		Pentachlorophenol	WP		0.023		0.028		0.026													0.028		0.028	0.016	
No published criteria available		Picloram	H						0.28	0.12		0.091	0.22	0.095	0.088											
		Piperonyl butoxide	Sy									0.037											0.057		0.42	
		Prometon	H																							
Not detected (below detection limit)		Prometryn	H																			0.02				
		Propiconazole	F				0.013		0.023		0.013															
		Pyraclostrobin	F					0.032		0.028	0.034	0.027	0.025	0.025			0.067	0.023			0.01				0.005	0.009
No Data	--	Terbacil	H																			0.59				
		Thiamethoxam	I-N				0.015	0.141	0.012	0.067	0.08	0.045	0.01	0.031		0.016	0.063	0.055	0.023	0.025	0.092	0.018	0.031		0.026	0.075
		Triclopyr acid	H		0.039		0.075		1.2	0.13	0.13	0.042	0.044	0.036			0.12	0.043	0.55	0.056		0.175	0.1		0.046	0.026
		Trifloxystrobin	F				0.044		0.034										0.018	0.073						
		Streamflow	N/A	1.9	5.6	4.6	6.8	2.4	5.2	1.9	2.1	1.5	1.4	1.1	0.9	0.7	0.8	0.3	0.6	0.5	0.5	0.7	0.4	0.8	0.2	0.2
		Total suspended solids	N/A	4	4	3	10	4	5	6	4	7	4.5	41	8	22	8	26	7	17	--	5	40	4	4	15

‡ C: Carbamate, D: Degradate, F: Fungicide, H: Herbicide, I: Insecticide, IR: Insect repellent, L: Legacy pesticide, M: Multiple, N/A: Not applicable, N: Neonicotinoid, OC: Organochlorine, OP: Organophosphate, PY: Pyrethrin, Sy: Synergist, WP: Wood preservative, *Equipment malfunction. †Units are as follows: pesticides, µg/L; streamflow, cfs; and total suspended solids, mg/L.

Results Summary

- There were 304 total pesticide detections in Upper Big Ditch, 4 of which were at levels above assessment criteria.
- Upper Big Ditch has 101 more detections than any other Skagit site. The statewide pesticide detection average from 14 sites is 119.
- Bifenthrin and captan were detected above the assessment criterion for endangered species.
- Dinotefuran was the most frequently detected pesticide.
- Common products containing bifenthrin are Fanfare, Triple Crown and Sniper. Captan and Drexel are common products containing captan. Common products containing dinotefuran are Alpine, Scorpion and Venom.
- Bifenthrin and captan are pesticides of concern in Washington State. Bifenthrin has been detected in Skagit County above water quality criteria in the past and is very toxic to fish.

Recommendations

- Read and follow label directions to protect water quality.
- Eliminate drift and runoff to adjacent surface water.
- Implement best management practices, including conservation buffers, vegetative filter strips, sediment basins, and setbacks from water.
- Review pest control needs and select appropriate and less-toxic pesticides.
- Manage irrigation to prevent runoff, and check the weather forecast before application to prevent runoff due to rainfall.
- Maintain, inspect, and calibrate application equipment.